In the Claims:

Please amend Claim 1 as follows:

A4

1. (Amended) A method of making seed capsules by an agglomeration operation comprising wrapping a [nucleus/seed(s)] nucleus/seed in layers of fine particles by:

agitating and tumbling said seeds with material fines in an apparatus for agglomeration.

Please add the following new claim:

A5

--18. The method of claim 1 wherein said method comprises wrapping more than one nucleus/seed in layers of fine particles.--

In the Abstract:

Please add the following Abstract of the Disclosure on Page 57 of the specification:

--Abstract

A6

A method of making seed capsules by an agglomeration operation comprising wrapping a nucleus/seed(s) in layers of fine particles by agitating and tumbling the seeds with material fines in an apparatus for agglomeration.--

Response

Applicant has amended the specification as requested by the Examiner and added an abstract on a separate sheet of paper. Formal drawings are submitted as requested by the Examiner. Regarding Figure 5, the apparatus following element #36 is a sizing mill 37 and has been defined in the specification at page 38 line 3.

The Examiner has rejected claims 1-17 under 35 USC 112 based on the vague and indefinite language of line 2 in Claim 1, stating it is unclear whether the term within the

parentheses (s) is to be included in the claim or not. Applicant has amended claim 1 and added claim 18.

The Examiner has rejected claims 1-3 and 17 under 35 USC 102 as being anticipated by US Patent 4,250,660, Kitamura. Regarding claims 1-3, the Examiner states that Kitamura discloses a method of encapsulating seed by an agglomeration operation using agitating and tumbling to wrap seeds with layers of fine particles and prior to agitation and tumbling the seed is sprayed with a binding agent. The agitating and tumbling overcomes the natural tendencies of the material fines to bind to one another. Regarding claim 17, the Examiner states that Kitamura teaches that a fluidized bed is the apparatus used in the method.

Kitamura teaches a means to precondition a coating agent that, when applied to a seed, has properties that improve disintegration when applied, are more firm so the coating does not fall off during handling, and that creates a harder surface coating on the seed. Kitamura relates to a process for coating seeds, which is obtained by surface treating a coating powder and then coating seeds with the surface-treated coating powder. The coating powder is previously treated with a water soluble binder. Kitamura relates to the preparation of coated seeds. The Kitamura patent is classified by the U.S. Patent Office in the class for an apparatus for applying fluent coating materials to food stuffs.

The claims of the present invention do not teach wetting and then drying the coating agent. The present invention teaches that the coating becomes an integral part of the seed.

Kitamura teaches a process to produce coated seeds using a preconditioned coating material. Although the process of Kitamura results in ease of mechanical sowing

and handling and long term storage, it does not improve germination/establishment performance.

The process of Kitamura is a coating process that coats a seed with a preconditioned coating material that requires a coating machine. The apparatus used applies a fluent coating material. By fluent material is meant any material which flows or may be handled like a liquid or fluid substance. Coating machines are a liquid agglomeration process, not an agitation agglomeration process as claimed in the claims of the present invention. The machines and the processes are different. Sugar coating machines which are described by Kitamura are widely used in the pharmaceutical and food industries. They are also used for roasting and heating beans and edible nuts or seeds. Heat is applied to the pan as it rotates to cause a layering effect. Again, this is a coating technique, not an agitation technique. The fluidized bed in Kitamura is also being used for a coating technique and not as an agitation technique as described in the present invention.

In the process, an aqueous solution of a water soluble binder is mixed with the coating powder, and the mixture dried by heating to obtain a solid substance. The solid substance is powdered and then used for coating seeds. In carrying out the surface treatment, the method of treating uses a slurry comprising the powder, binder and water by a spray-drier, or methods using a Henschel mixer or kneader are properly selected.

The coating machines include for example, sugar coating machines, centrifugal fluidizing coating machines, fluidized bed coating machines and the like. Example 1 describes coating the seeds of petunia by placing them in a sugar-coating pan and

tumbling with surface treated diatomaceous earth by alternate addition of diatomaceous earth while aqueous solution having CMC is sprayed thereon.

The type of machines described by Kitamura are coating machines for a liquid agglomeration process, not an agitation agglomeration process as claimed in the claims of the present invention. The machines and the processes are different. Therefore Kitamura does not anticipate or make obvious the claims of the present invention.

The Examiner has rejected claims 4, 6 and 9 under 35 USC 103 as being obvious over Kitamura in view of US patent 5,126,203, Ritzer.

The Examiner states that Kitamura is silent on the pan pellitizer, a flow jet mixer or a rotary drum agglomerator, but that Ritzer teaches a mixer agglomeration method with binder agent using a pan pelletizer, a rotary drum agglomerator, or a flow jet mixer.

The Examiner states that it would be obvious to modify the agglomeration method of Kitamura with the apparatuses of Ritzer. These agglomeration apparatuses are well known in the art and one skilled in the art would select a pan pelletizer, a rotary drum or a flow jet mixer to satisfy different economic and time parameters and different types of fertilizer or nutrient coatings.

Ritzer relates to a mixer agglomeration method. The process of the present invention teaches pre-selecting the core seed. General agglomeration methods as taught by Ritzer teach that particles are randomly binded together. The combination of Kitamura and Ritzer would not make the present invention obvious. Kitamura would yield the same results as Ritzer, a random agglomeration of multiple seeds with multiple granules of coating materials, thistle balls.

Ritzer relates to deactivation of spent silicon powder. The process for stabilizing residual silicon comprises: pelletizing the residual silicon and impregnating the pellets with an organic binder. There is no nucleus or seed which is wrapped in the layers of fine particles. In Ritzer, the silicon powder is pelletized, but there is no nucleus or seed involved.

Therefore, Kitamura in view of Ritzer does not make the claims of the present invention obvious. The claims of the present invention relate to performing an agitating and tumbling process to wrap layers of fine particles around a nucleus/seed. The combination of Kitamura and Ritzer does not teach this process nor make it obvious.

The Examiner has rejected claims 5, 8 and 12 under 35 USC 103 as being unpatentable over Kitamura in view of US Patent 2,815,376 to Knowlton and Frigmaires Engineers Inc. Internet Products Home Page.

The Examiner states that Kitamura is silent on the paddle mixer, the powder and the ribbon mixer apparatus. Knowlton teaches that the paddle mixers and ribbon mixers are well known agitation coating mixing apparatuses, but is silent on the powder mixer. Frigmaires Engineers Inc. discloses that powder mixers and ribbon mixers are equivalent mixers. The Examiner states that it would have been obvious to modify the coating method of Kitamura with the mixers of Knowlton and Frigmaires since these mixers are alternate equivalent methods that perform the same intended function. These mixers are well known and one skilled would select a paddle, powder or ribbon mixer to satisfy different economic and time parameters and different powder applications.

Again as indicated under Ritzer, by using the coating method of Kitamura with the mixers of Knowlton and Frigmaires, a user would get thistle balls, as there is no means for preselecting the core seed.

Knowlton, 2,815,376, relates to production of urea in granular form. The process comprises introducing into an agitated mass of substantially dry particulate urea a concentrated solution of urea at a temperature a little higher than its set point while continuing the agitation of the mass until granules are obtained, then drying. There is nothing in Knowlton which teaches using the devices for wrapping a nucleus/seed in layers of fine particles. Knowlton specifically teaches creating granules from urea.

Frigmaires describes a ribbon blender/powder mixer suitable for homogenous mixing of dry powders of different bulk densities used in food, mineral, pharmaceutical, paint and chemical industries. Frigmaires does not teach using the ribbon mixer or powder mixer to perform an agitating and tumbling to wrap layers of fine particles around a nucleus/seed.

Therefore, the combination of Kitamura with either Frigmaires or Knowlton does not make the claims of the present invention obvious.

The Examiner has rejected claims 13 and 15 under 35 USC 103 as being unpatentable over Kitamura in view of Mars Mineral Internet Products Home Page. The Examiner states that Kitamura is silent on a pin mixer or pin type mixer. Mars Mineral discloses a pin mixer well known in the art for agglomeration applications. The examiner states it would have been obvious to modify Kitamura's agglomeration method with the Mars apparatus since the pin/pin type mixer is an alternate equivalent agglomeration apparatus that performs the same intended function. These mixers are well known in the

art and one skilled would select a pin/pin type mixer to satisfy different economic and time parameters and different powder applications.

Again as indicated under Ritzer, by using the coating method of Kitamura with the mixers of described by Mars, a user would get thistle balls, as there is no means for preselecting the core seed.

The Mars Mineral Pin Mixer is a pin-type solids processor for mixing or micro-pelletizing. It is a high speed, conditioning and micro-pelletizing device that converts dust into small agglomerates through a high speed rotor shaft and pin assembly and the addition of liquids such as water, binders, oil or surfactants. Materials agglomerated in the Pin Mixer include: carbon black, cement kiln dust, pigments, coal dust, pesticides, electric furnace baghouse dust, limestone fines, graphite, coke, petroleum coke fines, bauxite and silica fume.

As a fine spray of liquid is added at the entry section and distributed throughout the powder, fine mixing and mixer agglomeration occur. The end result is a wetted, agglomerated and densified micro-pellet.

Mars Mineral specializes in agitation pelletizing. This is a process that converts fine dusts and powders into spherical shaped pellets. Pelletizing is defined as an agglomeration process whereby an amorphous mass of finely divided particulates, such as dust, powder, fume, is formed into a pellet, a ball or granule in the presence of moisture added during the process.

The pin mixer described by Mars does not teach using the pin mixer to perform an agitating and tumbling to wrap layers of fine particles around a nucleus/seed. There is no

nucleus/seed taught by Mars. Therefore, the combination of Kitamura and Mars does not make the claims of the present invention obvious.

The Examiner has rejected claim 7 under 35 USC 103 as being unpatentable over Kitamura in view of US Patent 6,202,346 to Lyons.

The Examiner states that Kitamura is silent on a horizontal pan. Lyons discloses a seed coating method and that the industry standard for coating is pan-type arrangements including the horizontal pan. The Examiner states that it would have been obvious to modify the seed coating method of Kitamura with the apparatus disclosed by Lyons since the horizontal pan is an alternate equivalent agglomeration apparatus that performs the same intended coating function. The horizontal pan is well known and one skilled would select the horizontal pan to satisfy different economic and time parameters and for different powder applications.

Lyons teaches a coat that is a polymer and dry particulate combined material that is thinly placed around each seed. The process taught by Lyons is a liquid coating that cures to become the coat. This differs from the process described in the present invention. Again as indicated under Ritzer, by using the coating method of Kitamura with the mixers of described by Lyons, a user would get thistle balls, as there is no means for preselecting the core seed.

Lyons relates to seed coatings comprising limestone or other water insoluble particulate matter. The coatings make the seed size desirable. The current industry standard for coating alfalfa seeds is place coating on seed in an amount based on 33% of weight of seed. Coatings have been applied using a rotary drum method where a seed is tumbled while coating is sprayed on and a stream of hot air is directed at coated seeds.

Other coating methods include pan-type arrangements known in the art. Lyons teaches a thin seed coating. Preferred coating procedure is a continuous coating machine. Lyons describes a liquid coating process and not a agglomeration operation comprising agitating and tumbling seeds with material fines in an apparatus for agglomeration which wraps layers of material fines around the seed or nucleus.

Therefore, the combination of Kitamura and Lyons does not make the claims of the present invention obvious.

Claim 10 is rejected under 35 USC 103 as being obvious over Kitamura in view of US Patent 5,130,171 to Prud'Homme. The Examiner states that Kitamura is silent on a planetary mixer. Prud'Homme discloses a planetary mixer used in a seed encapsulating method. The Examiner states that it would have been obvious to modify the coating method of Kitamura with the apparatus of Prud'Homme since the planetary mixer is an alternate equivalent apparatus that performs the same intended function in the coating process. The planetary mixer is well known in the art and one skilled would select the mixer to satisfy different economic and time parameters and for use in two coating operations.

Prud'Homme relates to another liquid application process. Again as indicated under Ritzer, by using the coating method of Kitamura with the mixers described by Prud'Homme, a user would get thistle balls, as there is no means for preselecting the core seed.

Prud'Homme relates to encapsulating particles of active substance by spraying them with a thermoplastic silicone copolymer in solution in an organic solvent or in an aqueous dispersion or emulsion and removing the solvent or water by drying with hot air.

The spraying/drying process is, i.e., Wurster process. The active substance may be a catalyst, perfume, colorant, cosmetic product, medication, plant protection product or plant seeds. Prud'Homme describes a liquid coating process and not a agglomeration operation comprising agitating and tumbling seeds with material fines in an apparatus for agglomeration which wraps layers of material fines around the seed or nucleus.

Therefore, the combination of Kitamura and Prud'Homme does not make the claims of the present invention obvious.

The Examiner has rejected claims 11, 14 and 16 under 35 USC 103 as being unpatentable over Kitamura in view of US Patent 5,891,246 to Lund.

Kitamura is silent on a cone mixer, vertical mixer or a cone pelletizer. Lund discloses a seed coating apparatus that use a cone mixer. The Examiner states that applicant did not define a cone pelletizer and vertical mixer. Lund's apparatus discloses a vertical mixer since the coating apparatus of Fig. 1 has a vertical orientation and it discloses a cone pelletizer since it performs the step of pelletizing and has a cone shape configuration. The Examiner states it would have been obvious to modify the method of Kitamura with the apparatus of Lund since they are alternate equivalent apparatuses that perform the same intended function. These agglomeration apparatuses are well known in the art and one skilled would select a vertical mixer or cone pelletizer/mixer to satisfy different economic and time parameters and for different types of fertilizer or nutrient coatings.

Lund again relates to a liquid coating application. Again as indicated under Ritzer, by using the coating method of Kitamura with the mixers of described by Lund, a user would get thistle balls, as there is no means for preselecting the core seed.

Lund relates to a seed coating apparatus for applying a coating fluid to seeds, consisting of a seed input, housing connected having seed output, rotating seed dispersing member, moving air curtain which keeps coating fluid in a rotating fluid dispenser. The fluid is dispersed vertically. Lund describes a liquid coating process and not a agglomeration operation comprising agitating and tumbling seeds with material fines in an apparatus for agglomeration which wraps layers of material fines around the seed or nucleus.

Therefore, the combination of Kitamura and Lund does not make the claims of the present invention obvious.

Applicant believes the application is now in condition for allowance.

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Signature: Debbie Broderick

Name: Debbie Broderick

PMW:db

Respectfully submitted,

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A first stationary spray assembly 28 extends longitudinally within drum 10 above and adjacent the bed 20 of seed and/or seed capsules. First ~~spay~~ Spray assembly 28 includes pipe 29 and nozzles 30. A second spray assembly 32 extends longitudinally within drum 10 generally adjacent first spray assembly 28. Second stationary spray assembly 32 includes pipe 33 and nozzles 34, which transport the material to be sprayed. Nozzles 30 and 34 are connected to pipes 29 and 33 respectively, and project sprays of liquid or otherwise particulate coating material toward the bed of seeds and/or seed capsule precursors. The description of spray assemblies 28, 32 as stationary means that the spray assemblies to not rotate with drum 10. However, the positions of either nozzles 30, 34 or pipes 29, 33, or both, can be adjusted within the drum for proper direction of the respective spray or sprays onto the bed of seeds and/or seed capsules or seed capsule precursors.

A stationary protective cover 24 is mounted over the spray assemblies. Seeds and/or seed capsules falling from the inner surface of the drum and the flights, above the spray assemblies, fall onto the cover, and are deflected away from the spray assemblies, as shown in FIGURE 1. Thus, cover 24 protects the pipes and nozzles from the falling seeds and seed capsules falling onto and fouling the pipes and spray nozzles.

As drum 10 rotates, flights 22 lift and mix the ~~sees~~ Seeds, seed capsule precursors, and seed capsules, but do not generally carry the bulk of the seeds and seed capsules up to the top of the drum. Some small amount of seeds, seed capsule precursors, and seed capsules will be carried upwardly to the top of the drum by even a drum devoid of any flights. Thus, all drums experience some amount of seeds and seed capsules falling from the

From the granulator, the seed capsules flow into dryer 136 and are dried to a final product moisture of about 2-3% by weight water. The resultant product is then screened by screen 30 and sized as before, by sizing mill 37 with undersized and oversized product seed capsules being recycled for further processing.

Urea and other liquid inorganic chemical fertilizers can, as indicated, be used as binders to bind together soil conditioning coatings which are not readily self-bonded together. In such embodiments, the urea or other liquid fertilizer composition serves as the binder or glue which holds together the soil conditioning material which is used as the coating. Other binding materials may be used either alone or in combination with the inorganic chemical fertilizer. Any plant nutrient components of the binder/glue composition contribute to the plant nutrient value, e.g. nitrogen, phosphorous, and/or potassium, provided by the so-made seed capsules. Thus, a binder/glue, or a multiplicity of binders/glues, properly selected as to nutrient value can provide, in the finished product, significant contribution to any desired fertility analysis.

A primary purpose of soil conditioning products is to condition the soil in terms of properties other than direct provision of plant nutrients.

The primary purpose of conventional inorganic chemical fertilizer products is to directly provide plant nutrients. It is well known that highly purified forms of inorganic chemical materials are more concentrated than desired in close or intimate proximity with seed, in the growing medium. Thus, inorganic chemical fertilizers can be diluted in concentration and still have sufficient nutrient content to be highly useful additives in soil conditioning seed capsules of the invention. It is common practice to modify and thus dilute inorganic chemical fertilizer products with filler materials that do not provide plant

away in surface water run-off. Thus, the coating about the seed serves many of the functions typically performed by the conventionally-used straw mulch. Accordingly, product of the invention can be used to seed new lawns without any need for use of straw or any other mulch material.

Where seed is desirably used to fill in bare spots in the lawn, such seed, especially fertility-enhanced seed capsules, may be applied desirably in one of two ways. First, the coated seed capsule product may be applied only to perceived bare spots, without use of straw. The soil conditioner in the seed capsules serve the functions of the straw as described above, but perform better than straw because of the close association between the seed and the soil conditioner.

In the alternative, the coated seed capsule product ~~may e~~ Maybe broadcast generally over the entire lawn. Where the lawn is already healthy with thick grass growth, the soil conditioner and fertilizer will benefit the existing grasses, with minimal germination and growth of new seed from the seed capsules. Where the existing grass is thinner, the seeds in the seed capsules will have room and light to grow, whereby the combined properties of seed, soil conditioner, and fertilizer, in intimate relationship with one another, will be efficaciously used.

Where seed capsules of the invention are used to establish a new lawn, the soil conditioner in the seed capsules serve the functions of the straw as described above, obviating the need for straw in establishing the lawn seeding.

Those skilled in the art will now see that certain modifications can be made to the apparatus and methods herein disclosed with respect to the illustrated embodiments, without departing from the spirit of the instant invention. And while the invention has

Claims

1. A method of making seed capsules by an agglomeration operation comprising wrapping a nucleus/seed(s) in layers of fine particles by:

agitating and tumbling said seeds with material fines in an apparatus for agglomeration.

2. The method of claim 1 wherein prior to agitation and tumbling said seed is sprayed with a binding agent to ensure proper agglomeration.

3. The method of claim 1 wherein said agitating and tumbling overcomes the natural tendencies of said material fines to bind to one another.

4. The method of claim 1 wherein said apparatus is selected from the group consisting of a pan pelletizer, a disk pelletizer or a balling disk.

5. The method of claim 1 wherein said apparatus is a paddle mixer.

6. The method of claim 1 wherein said apparatus is a rotary drum agglomerator.

7. The method of claim 1 wherein said apparatus is a horizontal pan.

8. The method of claim 1 wherein said apparatus is powder blenders.

9. The method of claim 1 wherein said apparatus is a flow-jet mixer.

10. The method of claim 1 wherein said apparatus is a planetary mixer.

11. The method of claim 1 wherein said apparatus is a cone mixer.

12. The method of claim 1 wherein said apparatus is a ribbon mixer.

13. The method of claim 1 wherein said apparatus is a pin type mixer.

14. The method of claim 1 wherein said apparatus is a verticle mixer.

15. The method of claim 1 wherein said apparatus is a pin mixer.

16. The method of claim 1 wherein said apparatus is a cone pelletizer.

17. The method of claim 1 wherein said apparatus is a fluidized bed.

REVISED PAGES

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away to surface water run-off. Thus, the coating about the seed serves many of the functions typically performed by the conventionally-used straw mulch. Accordingly, product of the invention can be used to seed new lawns without any need for use of straw or any other mulch material.

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In the alternative, the coated seed capsule product maybe broadcast generally over the entire lawn. Where the lawn is already healthy with thick grass growth, the soil conditioner and fertilizer will benefit the existing grasses, with minimal germination and growth of new seed from the seed capsules. Where the existing grass is thinner, the seeds in the seed capsules will have room and light to grow, whereby the combined properties of seed, soil conditioner, and fertilizer, in intimate relationship with one another, will be efficaciously used.

Where seed capsules of the invention are used to establish a new lawn, the soil conditioner in the seed capsules serve the functions of the straw as described above, obviating the need for straw in establishing the lawn seeding.

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1. A method of making seed capsules by an agglomeration operation comprising wrapping a nucleus/seed in layers of fine particles by:

agitating and tumbling said seeds with material fines in an apparatus for agglomeration.

2. The method of claim 1 wherein prior to agitation and tumbling said seed is sprayed with a binding agent to ensure proper agglomeration.

3. The method of claim 1 wherein said agitating and tumbling overcomes the natural tendencies of said material fines to bind to one another.

4. The method of claim 1 wherein said apparatus is selected from the group consisting of a pan pelletizer, a disk pelletizer or a balling disk.

5. The method of claim 1 wherein said apparatus is a paddle mixer.

6. The method of claim 1 wherein said apparatus is a rotary drum agglomerator.

7. The method of claim 1 wherein said apparatus is a horizontal pan.

8. The method of claim 1 wherein said apparatus is powder blenders.

9. The method of claim 1 wherein said apparatus is a flow-jet mixer.

10. The method of claim 1 wherein said apparatus is a planetary mixer.

11. The method of claim 1 wherein said apparatus is a cone mixer.

12. The method of claim 1 wherein said apparatus is a ribbon mixer.

13. The method of claim 1 wherein said apparatus is a pin type mixer.

14. The method of claim 1 wherein said apparatus is a vertical mixer.

15. The method of claim 1 wherein said apparatus is a pin mixer.

16. The method of claim1 wherein said apparatus is a cone pelletizer.

17. The method of claim 1 wherein said apparatus is a fluidized bed.

18. The method of claim 1 wherein said method comprises wrapping more than one nucleus/seed in layers of fine particles.